

**Army Looks
to ERDC for
Transformation
R&D**

Volume 1 Spring/Summer 2001



US Army Corps
of Engineers®

ERDC Connection

Weller says Farewell . . .

At the end of April, my active duty career drew to a close. It has been my pleasure to serve as the Commander of the U.S. Army Engineer Research and Development Center for the last year. Granted, my time here has been short, but I have enjoyed every minute of it. A day did not go by that I didn't learn about some new and exciting effort that someone was working on to further science and technology to provide support to our customers. The sense of pride that each of you demonstrate toward your work and this organization is contagious.

Col. John Morris will be on board as the next ERDC Commander in early July. He is excited about the opportunity, as he should be. I trust you will give him and his family the same warm welcome that you gave me. I wish you all the very best and if you find yourself in the Fort Worth area, give me a call and let me know how things are going.

Keep up the great work!!

Essayons

Col. Jim Weller



Col. Jim Weller



Col. Weller retires the colors a final time, signifying the end of his military career



Dr. Jim Houston presents Weller with a caricature commemorating his time at the ERDC



**US Army Corps
of Engineers®**
Engineer Research and
Development Center



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In this issue...

Welcome to the second (and long-awaited) issue of the ERDC Connection. Thanks also, for the great submissions sent in for our “Name the Publication” and pin contests. We have delayed announcing the winners of these contests because of new developments. We will announce the winners of both contests soon. Thank you for your patience.

This issue focuses on Army Transformation, and more specifically, ERDC’s role in supporting Army Transformation goals. Lt. Gen. Flowers has visited three ERDC sites at this point and his message concerning Army Transformation has been the same at each site. He said, “The Army is in the midst of the most significant change in perhaps its history. For the first time in a time of peace, we are trying to advance the science of the Army and take it far into the future so that we remain the dominant land power and are able to preserve peace.”

Some areas of focus within the ERDC to help meet Army Transformation goals are: Joint Rapid Airfield Construction; Modeling and Simulations and Joint Virtual Battlespace; TeleEngineering; Base Camp Survivability; and Joint Logistics Over The Shore. This issue of the Connection reviews four of these areas (JLOTS was featured in our last issue).

We hope you enjoy this look into our support to the Army, as well as the other articles published here. As always, we look forward to your comments and submissions for future articles. Please send your comments, suggestions, articles, etc. to the editor.

Army Chief of Staff visits ERDC

Gen. Eric K. Shinseki, Chief of Staff of the Army, toured portions of the U.S. Army Engineer Research and Development Center (ERDC), at the Waterways Experiment Station, June 24.

Shinseki was in Vicksburg to speak to the 412th Engineer Command's annual WARTRACE Conference. At the conclusion of his speech, Shinseki was briefed by Lt. Gen. Robert Flowers, commanding general of the Corps of Engineers, and Dr. James R. Houston, ERDC director, on ERDC support to Army Transformation.

Army Transformation is based on Shinseki's Army Vision, which he announced shortly after assuming command: "Soldiers on point for the Nation . . . Persuasive in Peace, Invincible in War," with the goals to become more responsive, deployable, agile, versatile, lethal, survivable, and sustainable. Research conducted at the ERDC is in direct support to Army Transformation goals.

While at ERDC, the group took a windshield tour of facilities and visited the TeleEngineering Operations Center, where Shinseki was briefed on TeleEngineering capabilities. He then participated in a live bridge reconnaissance mission between the center, the 54th Engineer Battalion in Bamberg, Germany, and the 130th Engineer Brigade in Hanau, Germany.



Gen. Eric K. Shinseki, Army Chief of Staff, arrives at ERDC Vicksburg



Shinseki is briefed by Lt. Gen. Flowers upon his arrival at ERDC



Shinseki enters the TeleEngineering Operations Center for a live feed demonstration of TeleEngineering capabilities

Flowers issues call for excellence

Lt. Gen. Robert Flowers, Chief of Engineers, has set a goal to visit each division, district, and laboratory in the Corps of Engineers in his first year as Chief. He has visited three of the four ERDC sites, and his message has been the same at each stop – *to provide excellence with integrity and credibility.*

“To provide excellence with integrity and credibility” is the main point in what Flowers hopes his epitaph will be after his tenure as Chief is over. The others are that he (and the Corps):

- Served the Nation through effective water resources
- Were great stewards of the environment
- Sought consensus and always tried to do what was right
- Served the Army in its transformation efforts

Flowers indicated that the Corps laboratories would play a major role in the Army’s future. He called us “the crown jewel in the Corps – little known, unsung,



Lt. Gen. Flowers asks Col. Jim Weller for the definition of “synergy,” and made the Colonel “drop and give him 20” when he failed to get the definition right

yet vital to the organization with a significant role as we move toward the future.”

He wants to make the Corps of Engineers synonymous with Stephen Covey’s definition of synergy and notes that each team member needs to embrace this definition:

”Synergy is the fruit of thinking win-win and seeking first to understand . . . It’s not compromise . . . it’s the creation of third alternatives that are genuinely better than solutions individuals could ever come up with on their own.”

According to the Chief, we each have four individual responsibilities: know your job; be situationally aware; be healthy; and treat everyone around you with dignity and respect. These are the hallmarks of positive, proactive people.

Flowers also touched on the significance that Army Transformation would have on the Corps of Engineers and the Nation. He said, “the Army is in the midst of the most significant change in perhaps its history. For the first time in peace, we are trying to advance the science of the Army and take it far into the future so that we remain the dominant land power and are able to preserve peace.”

His personal charge to ERDC team members is this. “You are special. You are part of an organization that has served this country and has never failed in 226 years. We (the Corps) are the only part of the federal government that makes money for the federal government. We actually return dollars and resources to the American taxpayer. And you (ERDC) are the cream of the organization.”



Lt. Gen. Flowers addresses ERDC employees in a town hall meeting in Vicksburg

Rapid Airfield Construction Critical for Force Projection

by Debbie Quimby, PAO

The Army Transformation goal of moving a brigade anywhere in the world in 96 hours, and one division in only 120 hours, will be a Herculean feat. But, the engineer soldier often performs Herculean feats to support the Army's mission.

One of the U.S. Army Engineer Research and Development Center's primary missions is to develop methods, technologies, and products to help the engineer soldier accomplish all tasks in the true tradition of the Corps of Engineers – "Essayons" – Let Us Try.

Army Transformation goals for brigade and division deployments will require aircraft, and more importantly, airfields. The ERDC Joint Rapid Airfield Construction (JRAC) project is developing the necessary tools for the engineer soldier to support aircraft operations in remote regions.

"JRAC is a natural extension of airfields and pavements research, lines of communication and other advanced technologies that we've been working on for years in the ERDC Geotechnical and Structures Laboratory," said Dr. Al Bush, JRAC Project Manager.

"Rapid airfield construction is a necessary technology for future theatres of war because the face of war is changing. In future wars or peacekeeping operations, we must be able to get our equipment and personnel into — and more importantly, out of — unknown locations quickly

and safely. Many of these locations will not have major airports to fly into, so we must construct safe airfields, and construct them quickly."

Rapid airfield construction includes three basic components:

- site selection
- rapid earthmoving
- rapid surface stabilization

Each part aids the engineer soldier with the major tasks required to establish a contingency airfield.

Site Selection

Many things must be considered when selecting a site for rapid airfield construction. The most efficient way of selecting a site is not looking over a topographic map, saying "hmm," and sticking a pin in the map. The JRAC site selection procedure considers strategic and tactical information, infrastructure connectivity, construction effort, and other factors and develops a list of candidate sites. The battlefield commander can then review these factors, decide what is most important for the mission at hand, and select a site. Once selected, the work effort required to prepare the site for use will dictate the type and amount of equipment required. Site selection considers the construction effort required and thus provides useful input to the earthmoving phase of JRAC. If an existing airfield is not available or suitable to meet mission requirements, some earthmoving will probably be required.

Rapid Earthmoving

Under JRAC, the term "rapid earthmoving" is used because the process utilizes construction equipment outfitted with advanced technologies that combine design, planning, and earthmoving operations with real-time information using radio communications. This technology allows unique capabilities, such as night operations without lighting, and eliminates manual surveying. These advances increase earthmoving productivity by 30 percent or more.



Photo by Hank Heusinkveld, Soldiers Radio and Television



Photo by Hank Heusinkveld, Soldiers Radio and Television

Rapid Surface Stabilization

When the airfield is brought to final grade, a surface that will sustain mission-required operations with minimal maintenance is needed. The third phase of JRAC provides a stabilized or improved surface for the airfield. Rapid surface stabilization techniques, such as sand fiber or matting, enables mission accomplishment with minimal regular maintenance or reconstruction during mission operations.

JRAC Experiment

In March, the 20th Engineer Brigade conducted a JRAC experiment at Fort Bragg, N.C. The experiment showcased an off-the-shelf Enhanced Earthmoving Capability (EEC) system. Two simulated sections of an Assault Landing Zone (ALZ) were constructed side-by-side. Each ALZ section consisted of identical designs with similar cut and fill requirements. One ALZ section was constructed using conventional construction equipment, while the other ALZ was constructed using equipment modified with the EEC product. The two construction efforts will be compared in terms of accuracy, productivity, manpower requirements, and situational awareness. The analysis is ongoing.

Capabilities of this experimental EEC system include the use of a global positioning system (GPS), a computer aided design (CAD) model for project design and planning, on-board electronics, and high-speed wireless communications. The radio network communicates with a control location and provides a necessary link with the GPS system to obtain X, Y, Z

accuracy to within an inch. This enables an equipment operator to sit in the cab of the machine, view a LED display screen, and see where the equipment is on the site. It also provides information to the operator, such as where cuts are needed, where fill material is needed, and where the site is at proper grade.

Future of JRAC

The JRAC program, although recognized as a much-needed technology, has been largely unfunded until recently. Program managers received word that the program will be funded from FY 03 to FY 07 for approximately \$16.5 million.

JRAC technologies will help the engineer soldier meet mission requirements to rapidly project and sustain the force and satisfy Initial Brigade requirements, as well as provide an initial effort to assess capabilities necessary for future military operational doctrine. And as long as American troops have a need, ERDC will continue its efforts to support the engineer soldier.



Courtesy of ERDC

Base Camp Survivability Research— “Protect the Force”

by Wayne Stroupe, PAO



Base camps are vulnerable to conventional and terrorist attacks

An 18-year-old Army private is on perimeter security for the peacekeeping force. The quiet night is shattered by the explosion of the rocket-propelled grenade hitting the plywood guard shack. The unit commander has the unenviable duty of writing the letter to the soldier's parents.

This situation has not happened yet, and if the Base Camp Survivability research program is successful, such a tragic event may never occur.

While full funding of this critical research effort is on the horizon, engineers in the ERDC Geotechnical and Structures Laboratory are providing assistance to our troops in the field now.

“We have been involved with force protection, field fortifications, and other protection research for decades. This research will build on a whole range of protective measures and research efforts,” said Pam Kinnebrew. She is the manager of the Force Protection on the Battlefield Program, from which the Base Camp Survivability research will evolve.

Base camps are now in Bosnia, Kosovo, and other locations across the globe. They are temporary, quickly constructed, military camps for humanitarian and peacekeeping operations and low-intensity conflicts.

“Base camps usually start with tents, and then build up to SEA huts,” said Kinnebrew. (Southeast Asia huts are plywood construction troop quarters.) “We need to pro-

vide protection in all phases of build up, construction, and operation of base camps, now and in the future.”

“Base camps have a wide variety of structures. Guard towers, troop areas, fighting positions, observation posts, critical asset areas, and many more facilities with unique protection requirements and protection levels.”

In the conflicts and operations of the future, we may see more base camps dotting the globe. These potential future operations are being addressed by the goals of Army Transformation. The Army of the future must be responsive, deployable, agile, versatile, lethal, survivable, and sustainable. The Base Camp Survivability Program will actively support the Army Transformation goals in survivability and in sustainability.

“This research will provide a planning capability for building base camps in the future. We will also develop improved, low cost, lightweight protective measures. These new protective materials and technologies will increase survivability over 30 percent and reduce logistics requirements by 20 percent,” said Kinnebrew.

According to Kinnebrew, ERDC first saw the need for base camp support on a field exercise with the 101st Airborne at Ft. Campbell. Rapidly deployable units like the 101st, the 82nd, and others are often the first to respond to hotspots around the globe.

“We were there to demonstrate the capabilities of our Antiterrorism Planner (a computer program for threat assessment and survivability planning),” said Kinnebrew. “They said, ‘This is great. But with our missions, what we really need is this, this, and this.’”

With its long history of customer support, that is just what the Corps R&D community did. The Geotechnical and Structures Laboratory started looking at how to improve the survivability of base camps and similar expedient construction for our troops.

“We are looking at a variety of new materials, such as Very High Strength Concrete, which was developed here at the Waterways Experiment Station site several years ago. Panels constructed of this concrete provide ballistic protection that is great for logistics and supply areas. You can replace thick concrete walls with only three-inch-thick VHSC panels. You can build a sandwich with the panels and fill the middle void with sand to provide enhanced troop protection for SEA huts or other troop quarters,” said Kinnebrew.

Other innovative materials are also being examined. Linex, commonly used to spray-in pickup truck bed liners, can be sprayed on various new materials to increase longevity. Ballistic fabrics, ultraviolet curable resins, and other materials are being researched to provide protection for SEA huts and other base camp structures.

Radar systems, communications, and other critical assets need specialized protective measures to ensure the fighting capabilities of our forces are never compromised. ERDC research is not only looking at advanced protective materials, but also at new technologies to build decoys, affect target signature management, and provide specialized protective designs for specific assets.

“Our research efforts include using different levels of numerical models, lab experiments, such as the Projectile Penetration Facility, and field experiments, such as those conducted last year at the Joint Readiness Training Center at Ft. Polk, La. In field experiments, we see if actual soldiers can build these structures with our new materials and designs,” said Kinnebrew.

The new protective technologies and materials being researched for military applications will also be made available to the private sector. This will help provide increased protection for terrorist threats to civilian buildings through various retrofit techniques.

The Base Camp Survivability Program is not scheduled to receive funding until FY 03. But when our forces call asking for help now, ERDC does not turn away.

“Through the TeleEngineering Operations Center, we have gotten numerous requests for assistance for base camp support, and some funding to act on these requests,” said Kinnebrew. “One request involved soldiers wanting to use ISO (international shipping) containers for protective positions and shelters. They wanted to bury the ISO containers for shelter. We did evaluations and provided procedures on ways to strengthen and brace the container so it wouldn’t collapse.”

Maj. Karen Walters, an ERDC colleague in force protection research, was previously stationed in Bosnia. She used her experience and the existing Antiterrorism Planner computer software to help determine protective measures to enhance the survivability of existing and proposed facilities.

“There hasn’t been an attack at one of our base camps, yet” said Kinnebrew. “But the probabilities are high that it might happen in the future. We need to have the research technologies ready to go. The bottom line for our research is to protect and possibly save lives in our forces.”

That life could be someone’s son or daughter standing guard in a foreign land. It could be yours.

Base Camp Protection / Survivability

UV Curable Resin on Ballistic Fabric

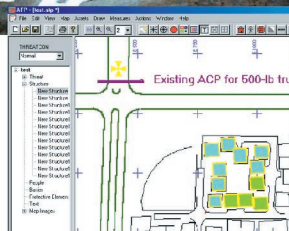
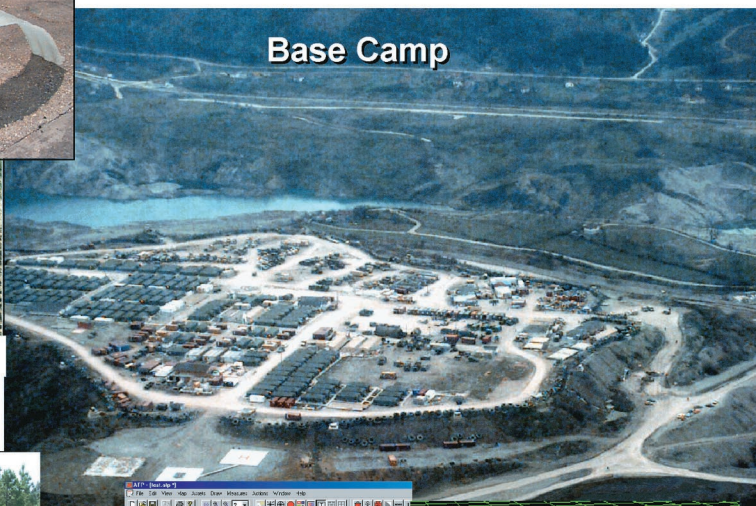


Aluminum Arch Overhead Cover

Advanced Materials for Ballistic Protection



Very High Strength Armor Panels



Antiterrorist Planner Threat Assessment



ISO Container with VHSC Panels



Linex Wall Retrofits



Observation Post Protective Positions

The ERDC is developing technologies to protect base camps around the world

Help Is Just a Call Away

by Wayne Stroupe, PAO

Army Transformation is molding our Army and our soldiers to face a multitude of new challenges, missions, and scenarios. While our soldiers are the best in the world, sometimes they encounter problems that are too complex or unique for them to solve in the field. However, new technologies are allowing them to “reach back” for help – via TeleEngineering.

TeleEngineering Operations is a technology demonstration being conducted by ERDC under the proponenty of the U.S. Army Maneuver Support Center. When soldiers encounter a complex field problem, they can quickly send information via advanced communications links to the TeleEngineering Operations Center. The Center taps the technical expertise of the Corps research laboratories, Corps districts and divisions, private industry and academia to provide expedient answers.

While the TeleEngineering name is fairly new, the basic concept has been a cornerstone of Corps service for years. The catalyst is advanced high-speed communications that link the soldiers with the problems to the people with the answers.

“We have always been involved with TeleEngineering, we just didn’t call it that,” said Dr. Larry Lynch, the Research and Development Program Manager for the TeleEngineering Operations Technology Demonstration.

“The Corps research laboratories have been providing one-stop R&D services to the military for years,” said Lynch. “Help was just a phone call away.”

As the problems faced by our global military presence grew more complex and daunting, an explosion of technology helped meet the challenge. “The advance in communications - the cell phone, visual teleconferencing, and secure satellite links - has given us the ability to communicate directly with the people on site and direct connectivity to the subject matter experts, wherever they are,” said Lynch.

The TeleEngineering concept got its “big break” at 3 a.m. on Dec. 27, 1995, when an engineer officer standing on the banks of the flooding Sava River placed a call on his cell phone to the Waterways Experiment Station in Vicksburg, Miss. To open the only avenue of approach for moving materiel and troops into Bosnia, the engineers were charged with building a floating bridge across the

rising river. But how much higher would the river rise? Would the float bridge withstand the river velocities?

Working with fellow ERDC researchers at the Cold Regions Research Engineering Laboratory, within three days engineers correctly predicted the flooding river had crested and the velocities would not endanger completion of the bridge.

Engineering support was also provided in Bosnia on base camp construction, road repair, soil stabilization, and many other problem areas. Digital photography provided near real-time views of specific problems and helped

experts at various locations back in the states provide workable solutions. Soldiers with problems in the field realized through experience that there was a wealth of technical knowledge across the globe that could quickly provide answers and support.

Realizing the potential in this emerging area, the TeleEngineering Operations

Technology Demonstration was initiated about two years ago under the proponenty of the U.S. Army Maneuver Support Center. The demonstration is being centrally facilitated by a TeleEngineering Operations Center at the ERDC Vicksburg site.

“We are still in the development stages in many areas,” said Lynch. “The Operations Center mission is both research and operations. The operations function is helping us understand what is required on the research end to provide rapid, accurate engineering analysis.”

Development of doctrine and protocols – how requests for information are submitted, who can submit requests, and the best way to respond – is ongoing. The total operational status and future funding of the Operations Center are also being developed.

“One thing we have determined is that hardware should never limit access. Communications is the link to our subject matter experts and ultimately to the answer,” said Lynch.

Working 24 hours a day, the TeleEngineering Operations Center supports long-range planning requests, war-fighter exercises, and troops in the field across the globe. Business has been good, according to Lynch.

“We have received hundreds of different requests for assistance. One request alone involved the analysis of over

. . . hardware should never limit access. Communication is the link to our subject matter experts and ultimately to the answer.

150 bridges. About 90 percent of the requests require assistance from technical experts.”

In FY 00, the Center responded to over 700 requests for assistance. While most of the calls for help come from military side, civil works questions arise, too. Troops in Kosovo need assistance with supply route throughput, soil stabilization, force protection, and bridge assessments. A Corps team in Africa needs large dam assessments due to disastrous flooding. Commands need freeze analysis for lakes and reservoirs. Warfighter exercises need terrain analysis and modeling information.

The TeleEngineering Operations Center acts as the clearinghouse for such requests and assistance. “We interface between the green suit Army and the white coat researchers. Researchers tend to give a lot more detail on how they determined the answer. The warfighter just wants the answer, and he wants it now,” said Lynch.

TeleEngineering can also support other branches of the armed forces. “We have supported the Navy and Marines in amphibious assault operations planning,” said Lynch. “We have supported the Air Force in airfield repair, dust control, and suitability analysis – can a plane land on this field and, more importantly, can it take off again.”

The potential impact and future use and dependence on TeleEngineering are growing. Force reductions limit our engineer assets. Complex problems can overwhelm limited resources in the field. Treaty and political constraints on force numbers for peacekeeping operations limit the engineer force numbers. New technologies and research

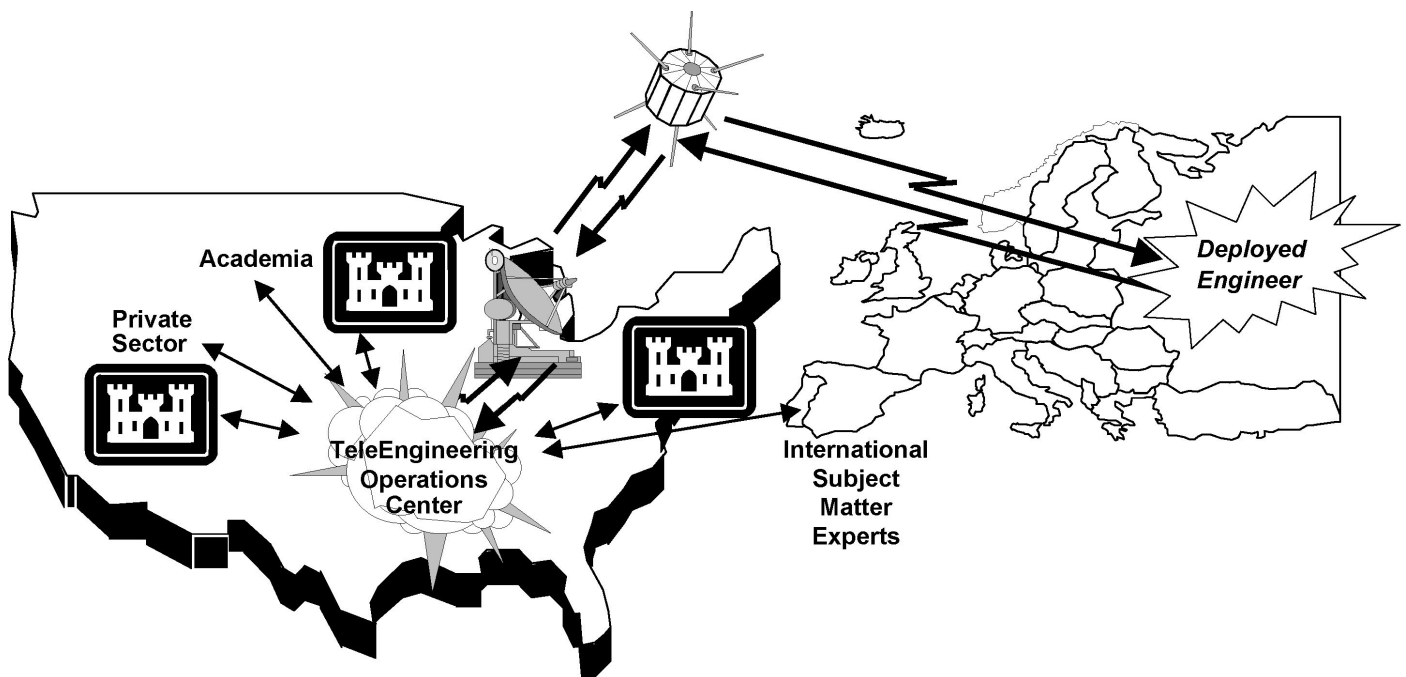
breakthroughs, such as TeleEngineering, are increasingly emphasized to meet these challenges.

Realizing the increasing importance of TeleEngineering, steps are under way to improve its operations. Investigative and reconnaissance equipment packages are being developed to help the deployed engineer forces gather the data needed by the remote subject matter experts to provide the best decisions. These range from simple field devices that help gather data on soil strengths to highly sophisticated developmental tools such as the Urban Robot, that is being developed for urban reconnaissance.

“We are moving into robotics, remote sensing, and the development of nondestructive devices for field use. These will help engineers in the field collect better data, faster. It will allow our subject matter experts to provide more accurate answers, faster,” said Lynch.

Other improvements include the TeleEngineering Tool Kit, a software package that aids the field engineer in determining exactly what he needs to request and provides it in the proper visual format (digital photos or video, graphs, or maps). This also aids the subject matter expert in responding to the question and prompts additional responses in potential related problem areas. Version 1.1 was recently released.

“There is a lot of pressure. We take it seriously since our decisions could potentially save lives, and a wrong decision could cost lives,” said Lynch. “TeleEngineering provides additional capabilities and hardware to allow the forward engineer elements to be more effective.”



TeleEngineering Concept

Modeling and Simulation Supports the Warfighter

By Jim Rogers, Dr. Niki Deliman, and Jack Huntley

Introduction

ERDC is a leader within the research and development community for modeling the physical properties of the environment and the interaction of systems with the environment. ERDC, in response to shifts in the Army's vision to move more towards reliance on virtual environments to train, analyze and prototype new systems, has followed suit by remolding existing models and developing new models to meet the challenges of the future. This modeling and simulation (M&S) initiative is designed to focus technology transfer to support analysis, requirements, and training by achieving common environments and enhanced realism for better decision support. ERDC has successfully demonstrated such technology to a variety of important audiences, including the U.S.



Army Training and Doctrine Command (TRADOC) M&S Advisory Council, Simulation and Modeling for Acquisition (SMART) Conference, and the MidEast Peace Process Track II.

Key Technology Transfer

M&S has been moving rapidly toward a more realistic depiction of the virtual battlespace. The ERDC has been contributing to this process in many ways. A few prominent examples include the adaptation of models to depict the realistic behavior and movement of vehicles, the capture and modeling of dynamic environmental affects on the performance of systems, and the development of terrain representations for 2D and 3D views. ERDC's capabilities and experience with terrain, environment, and M&S are being utilized as the foundation of the Joint Virtual Battlespace, which will provide a simulation-based acquisition capability for the Future Combat Systems.

ERDC has concentrated efforts in a number of areas that are providing technological advancements to M&S.

The NATO Reference Mobility Model, maintained and updated by the ERDC Geotechnical and Structures Laboratory, has been adapted to a number of Army and DoD simulation platforms. The deployment of a ribbon bridge has recently been modeled in the One Semi-Automated Force (OneSAF) Test Bed. Other efforts have made it possible to rapidly construct buildings with floor plans to support military operations in an urban environment. Further enhancements to represent engineering aspects in M&S are underway. The ERDC Cold Regions Research and Engineering Laboratory contributed greatly to the modeling and depiction of cold weather environments and their impacts on military operations. These initiatives include soil strength predictions and impacts on performance in cold regions.

ERDC has been involved directly in M&S, and in the timely and cost-effective generation of integrated terrain databases for the Army and other agencies within the DoD. The ERDC Topographic Engineering Center has been providing these services since the development of the SIMNET in the late 1980s, and continuing a variety of related simulations culminating in the Defense Advanced Research Projects Agency (DARPA) sponsored Synthetic Theater of War program in 1997. Many of the tools, models, and terrain databases used in JointSAF, ModSAF, CCTT, JWARS, WARSIM, and OneSAF Test Bed, had their origins in the DARPA SIMNET and Synthetic Theater of War program. ERDC has also served as the execution agent for the development of technologies to realistically model the physical battlespace. Specific technology developments have included the ModStealth OpenScene view port; the DTSim family of dynamic terrain simulators; the OASES environmental distributor for atmospheric, oceanic, and littoral data; and models used to realistically represent environmental phenomenology within the virtual battlespace. Various aspects of these technologies have been transferred to new, fielding, simulations such as JWARS, JSIMS and WARSIM. ERDC continues to support multiple technology development programs, including: improvements to current environmental and terrain representations within the DMSO Environment Federation (EnviroFed) project, enhancements to our ability to cost-effectively generate wide-area terrain databases in the Terrain Scenario Generation and Archiving project, and support for joint experimentation with the JSAF Federation at the Joint Forces Command.

ERDC; the Joint Precision Strike Demonstration; the U.S. Army Simulation, Training, and Instrumentation Command (STRICOM); the TRADOC Analysis Center; the U.S. Army Maneuver Support Center (MANSCEN); and the U.S. Department of Energy are constructing a joint virtual battlespace to support Simulation Based Acquisition for Future Combat Systems.

Joint Virtual Battlespace (JVB) will be a multi-service, multi-sided interactive federation of simulations that integrates OneSAF Test Bed, EAGLE, JointSAF, Multi-Sim, Joint Terrain Analysis Tools, the NATO Reference Mobility Model II, and other models and simulations. JVB includes joint forces, joint fires, and joint C4ISR. In joint virtual battlespace, Future Combat Systems concepts will be operationally evaluated. JVB will also allow the Army to “plug-in and play” proposed technologies, CONOPS, and TTPs to evaluate their benefit prior to an investment decision. It will be scalable from the individual system/sub-system to the Joint Task Force.

Instead of risking the development of multiple environmental constructs that may include differing environmental assumptions, JVB will provide a common environment containing the multitude of environmental variables that will impact Future Combat Systems. Initially this construct will support virtual test and evaluation of alternative Future Combat Systems designs, and then evolve into a JVB construct providing situational awareness and course of action analysis to the Future Combat Systems life-cycle acquisition process and the Objective Force. JVB will provide a common battlespace awareness in a distributed architecture across the Future Combat Systems C4I information grid.

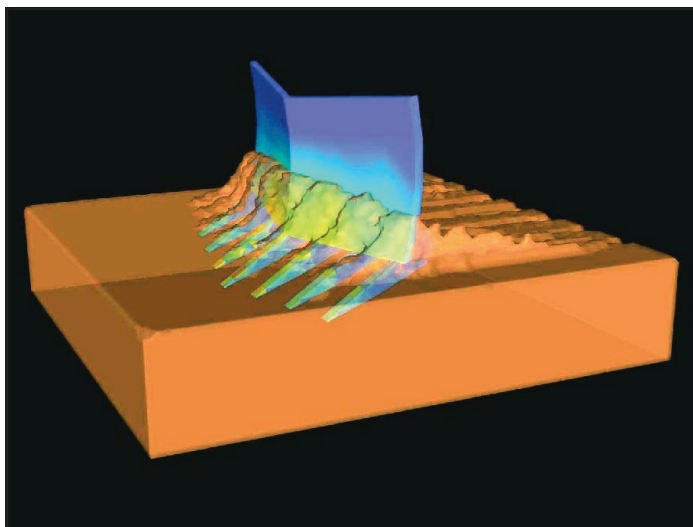
JVB will provide an accurate and scalable common battlespace environment for Future Combat Systems and support information superiority, dominant maneuver, and increased situational awareness for the Objective Force. A consistent and scalable joint virtual battlespace construct will substantially enhance the lethality, survivability, trans-



portability, deployability, and mobility capabilities of Future Combat Systems. A JVB construct will provide a high fidelity, high-resolution simulation based acquisition environment to accurately test and evaluate Future Combat Systems alternatives. These battlespace environment models and applications will improve the military decision making process through the accurate assessment of dynamic terrain and environment on operational entities, factors, and conditions.

Summary

ERDC has joined with several other Army organizations, such as AMSO, STRICOM, and TRAC-WSMR to work on terrain issues such as consistency, correlation, and interoperability between simulation platforms, as well as between M&S and C4I systems. With the emergence of more powerful and inexpensive computing platforms and with the increasing sophistication of models being used in M&S and C4I systems, the demand for terrain and environmental data has never been greater. Higher resolution data, a multiplicity of environmental data types and formats, and the dearth of warfighter-ready high-quality environmental data have become serious issues when attempting to use M&S systems for training and simulating conditions in many different military (or potentially military) theaters of operation. ERDC is not only addressing today’s requirements for terrain, and environmental representations, but is positioned to address the future joint requirements in M&S and C4I systems. As we achieve the goal of “train the way we fight, and fight the way we train” the respective terrain and environmental data requirements for M&S and C4ISR will converge, and ERDC will be there developing the technology to satisfy those joint requirements and transitioning it to operational “go-to-war” systems.



Mobile Plasma Arc System Destroys Waste Onsite

by Dana Finney, PAO

Research at ERDC's Construction Engineering Research Laboratory (CERL) has resulted in a modular system that can travel to different sites and destroy some of the most toxic wastes produced in the defense business. Better yet, it does so without hazardous emissions or harmful combustion byproducts.

MSE Technology Applications, Inc., has produced the Mobile Plasma Treatment System (MPTS) by taking advantage of CERL's long-term research on plasma arc technology. The MPTS consists of skid-mounted modules with most of the action occurring in an enclosed, water-cooled hearth that contains a plasma arc torch. When

electricity is supplied to the torch, it ionizes and heats a process gas to more than 12,000 degrees F. This extreme heat melts the waste fed into the hearth. The molten material cools, producing a glassy material, which is environmentally benign.

Plasma arc torch research originally focused on using the technology to destroy asbestos. After laboratory and pilot-scale demonstrations showed its promise for treating many types of hazardous waste, Congress funded follow-on research to bring plasma arc systems to a commercial state. ERDC used the Congressional funding to contract MSE, a Department of Energy facility operating



Mobile Plasma Treatment System set up for operation

contractor in Butte, Mont., to build the first mobile plasma operational prototype based on completed R&D.

Mobile Unit

The main goal in developing the mobile plasma arc torch was to avoid costs and liabilities for transporting the waste material to an offsite treatment facility. In addition, there may be cases for which an installation has a limited use for the MPTS, such as a one-time destruction of stockpiled waste. Investment in a fixed plasma arc facility would not be cost-effective for such uses.

To be a workable product, the plasma system had to: (1) conform to physical constraints of trailer-mounting, (2) be rugged enough to withstand the rigors of over-the-road transport, (3) have layout and design features to ensure safe, reasonable equipment access for system setup, maintenance, and teardown, and (4) be able to safely destroy multiple waste streams (solids, solid-containing liquids, and sludge) at a productive rate and with no hazardous byproducts.

CERL tested the MPTS for a year ending last fall. Experimental feed batches weighing more than 1,700 pounds were tested in seven separate tests. The waste consisted of both Cartridge Actuated Devices and Propellant Actuated Devices (CADs/PADs). The unit was also tested for range scrap recycling to collect reducing atmosphere operating data and to evaluate system emissions for volatile metals, particulate, and slag metal quality. Tested range scrap material consisted of solid-steel bullets in the shape of a cone, about 3 inches at the base and 4.5 inches long. A total of 2,000 pounds of metal tips (about 800 bullet tips) were processed throughout the testing, with over 50 hours of plasma arc torch operation completed.

The MPTS performance and emission data for range scrap recycling test results for volatile metals were below the Maximum Achievable Control Technology standards and the particulate emissions were several orders of magnitude below the standard of 0.015 grains per dry standard cubic foot, while furnace operators were able to recover more than 95 percent of the iron in slag pours. The glassy residue met the requirements for leaching less than five parts per million under the EPA's Toxicity Characteristic Leaching Procedure. Results to date indicate that plasma technology is a powerful tool for converting unique military wastes into inert, vitrified slag.



Cartridge actuated devices prepped for testing

Uses and Operating Costs

The MPTS can safely destroy a diverse range of hazardous wastes from military operations. Examples are: sludge containing heavy metals; contaminated blast media; pesticides and PCBs; waste paints, thinners, and solvents; oil-soaked media; materials contaminated with chemical agents; asbestos-containing material; obsolete ordnance and energetics; incinerator ash; and batteries.

Agencies with a demilitarization mission could also look to plasma arc technology to dispose of excess munitions. The MPTS represents an alternative to open burn/detonation – a disposal method coming under increasingly strict regulatory limits due to the large amounts of particulates, heavy metals, and smoke introduced into the atmosphere.

The cost to process hazardous waste in the MPTS varies from \$2000 to \$600 per ton, depending on the nature of the material and complexity of treatment required. Savings are achieved mainly in the transport cost; however, intangible benefits accrue in terms of eliminating future liability and enhanced ability to comply with the Clean Air Act and the Resource Conservation and Recovery Act. Site-specific assessments are needed to determine the potential cost savings.

Conclusion

The Defense Ammunition Center has purchased the first MPTS and the Armament Research and Development Engineering Center is executing a project to modify the system and set it up at Crane, Ind. The purpose is to demonstrate and validate the unit over two years for demilitarization.

Patents and Inventors Display ceremony pays tribute to past and present recipients

Jackie L. Bryant, PAO

In what Col. James A. Walter, TEC Director, described as a “long overdue tribute”, the Patents and Inventors Display unveiling was held during a ceremony here recently. The 12 plaques, which line the wall near the Executive Office, serve as recognition of the research and development accomplishments of past and present patent recipients who were never officially recognized by the laboratory.

Edward Roof was TEC’s first patent recipient in 1981. He was instrumental in developing systems which improved the accuracy of data used in surveying.

Leighty and Lukes

Dr. Robert Leighty and George Lukes received a patent in 1982. They collaborated in the area of computer-assisted photo interpretation research. They are the co-inventors of stereo “super-positioning,” which allows a user to scan a map source and position it over a terrain simulation to ensure proper positioning of models in relation to actual ground features.

Benton

In 1980, John Benton became a member of a newly formed robotics team, which was responsible for the development of a robotics and artificial intelligence program for the Army through the year 2000. In addition, he performed research in support of terrain reasoning and battlefield planning. His patent was granted in 1984.

Chen, Rohde, and Seemuller

The team of Dr. Pi-Fuay Chen, Dr. Frederick Rohde and Dr. William Seemuller garnered two patents in 1984 and 1986, respectively. Their areas of expertise involved research and development projects which included radar feature extraction and the application of sensing arrays to mensuration for aerial photographs and maps. While at TEC, Chen’s extensive research earned him three patents.

McDonnell

Software developed by Michael McDonnell, a patent recipient in 1985 and a 1990 co-recipient, made it possible to produce very realistic perspective scenes using a relatively simple computer. McDonnell also developed applications that made use of a high-speed parallel computer to create terrain fly-throughs.

Rosenthal

Richard Rosenthal’s (a 1986 patent recipient) invention provides a digital technique for constructing variable-width cartographic lines and includes an algorithm developed to generate symbolized lines using multiple stroked centerline data.

Robertson

Kenneth Robertson’s invention concerns methods and apparatuses for measuring angles and changes in angles by projecting light beams onto mirrors, and measuring the angle between the incident and reflected beams. His patent was granted in 1988.

Dere and McDonnell

One invention that continues to be used by the artillery is the Circumpolar Reticle for the M-2 aiming circle. Donald Dere's and Michael McDonnell's invention is a highly effective method and reticle plate for establishing a North or South line by circumpolar orientation. Their 1990 patent improved the M2/A2 aiming circle. The device allows the user to find an accurate north orientation on clear nights. With the data received for the aiming circle, artillery units can determine their azimuth and determine the coordinates of targets.

Hevenor and Chen

In 1994, Richard Hevenor and Dr. Pi-Fuay Chen received a patent as co-inventors for "Automated Extraction of Airport Runway Patterns from RADAR Imagery." This invention is an automated method of extracting airport runway data from an original radar image, which could be useful in locating small airstrips used in clandestine activities.

Brown

Roger Brown is the most recent patent holder. He received a patent in 2000 for his invention that allows a more rigorous sensor model from stereo imagery to be handled with a simpler mathematical model of aerial vertical frame photography. This method can be used by a larger user group and provides better exploitation of the stereoscopic data.

Future Patents

Currently, TEC is pursuing a patent for the Real-Time Kinematic (RTK) Global Positioning System (GPS) Tides, a new GPS-based hydrographic navigation system, which eliminates tidal uncertainties of hydrographic surveys in coastal areas. The RTK GPS method is the only technique allowed to be used during contract dredging operations in the Saint Mary's Entrance Channel in the Jacksonville District. Another patent application for vessel navigation also has been filed.

(Mr. Arthur C. Cage III contributed to this article.)



From left to right: Donald Dere, George Lukes, Dr. Robert Leighty, Michael McDonnell, Roger Brown, Dr. William Seemuller and Richard Rosenthal (Photo by John Frost, TEC)

ERDC Team Leads Corps' Land Management System Development

by William Goran, Jeffrey Holland, John Barker, and Andrew Bruzewicz

LTo witness the agony and ecstasy of a real virtual team at work, watch the Land Management System (LMS) developers in action. This multi-year program involves seven ERDC labs, U.S. Army Corps of Engineers (USACE) Districts, the Water Resources Support Center, military land managers, and the Civil Works community in a huge developmental effort.

LMS is an initiative focused on improving analysis and management capabilities in several USACE major mission areas.

These mission areas include the civil works programs (navigation, flood control, water supply and quality, recreation, environmental restoration, etc.), military installations operations and management (specifically military land management), and military engineering and terrain-related operations (trafficability analysis, military hydrology, littoral operations, line-of-site analysis, etc.).

LMS is a "consistent delivery" framework for computer-based land and water resource management and analysis tools. That is, it was established to provide delivery of the right information to the right place at the right time using an integrated approach to models, modeling systems, and

decision support systems.

Traditionally, development of individual models, linked models solving a set of related problems, and decision support systems have occurred in a piecemeal way, focusing on narrowly defined problems and problem sets. This piecemeal approach

was necessitated by a range of constraints, including limited computing power, insufficient understanding of physical processes and related biological responses, and the stovepiping of technology programs to address single problem issues.

LMS provides a cost-effective alternative to the traditional approach through development of a common, integrated framework providing solutions to land and water management problems. The LMS includes information about, and access to, all LMS environmental models and their data, assistance in selecting the most appropriate models to deal with a single problem or a suite of land management problems, the transparent movement of data between LMS models, and output supporting land management decisions through the evaluation of management alternatives. Access will be provided using commercial and government-developed software tools.

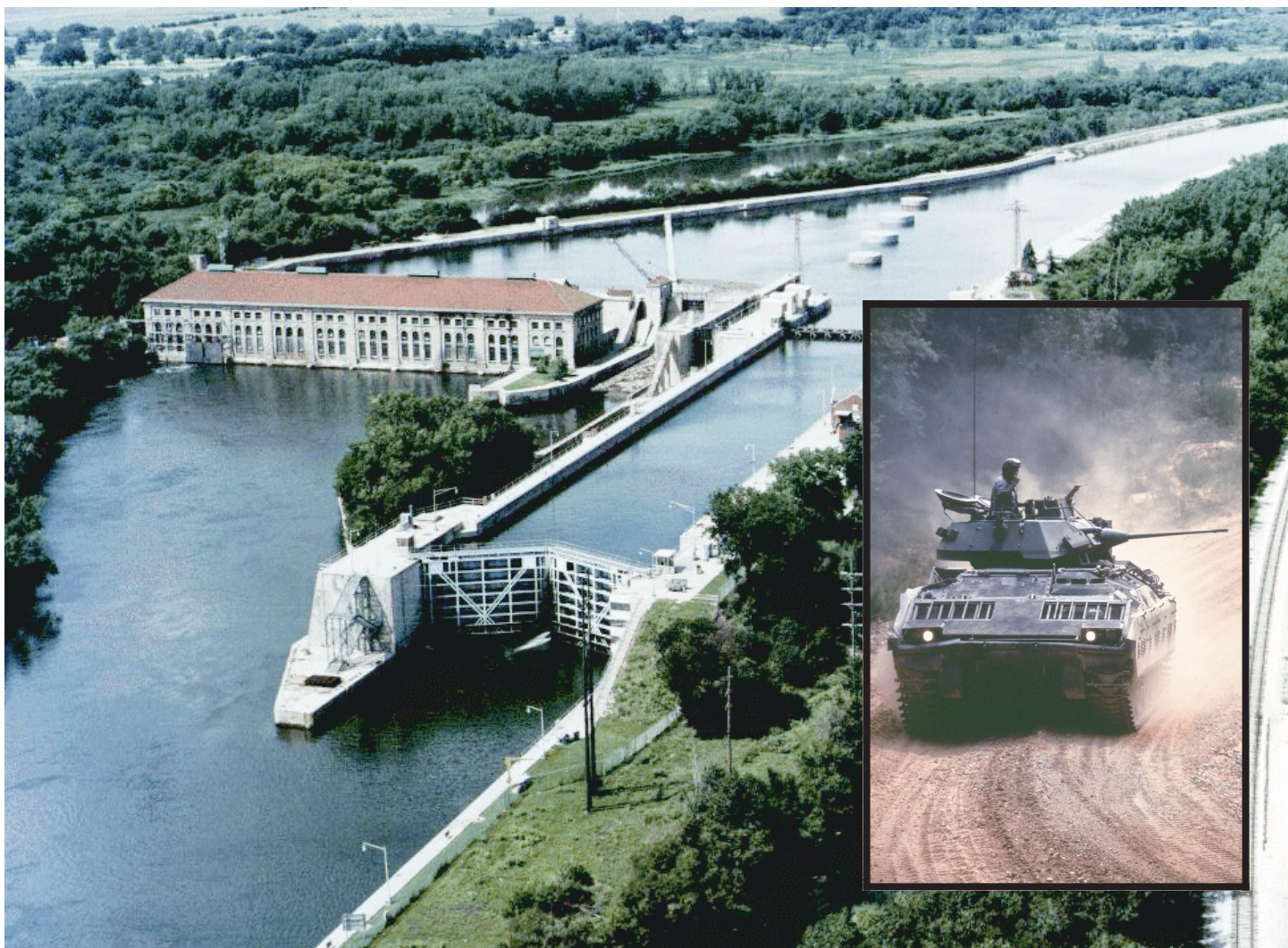
Initially, LMS will evaluate existing models, systems of models, and decision support systems. The first LMS built from these "legacy" (pre-existing) components will be expanded to include a growing collection of models developed both inside and outside the Corps through the adoption of protocols, enabling their integration into a linked operating environment. In a parallel effort following ongoing industry-driven developments, new (and next versions of existing) models will be developed with links to evolving standards for data exchange.

Savings in cost and time will be realized through two major pathways: unique bridging software will no longer have to be written to enable the exchange of data between models incorporated into the LMS; and a common interface and display environment will eliminate the need to develop this portion of any new software. Programming efforts will be exclusively directed toward the computational portions of the new models and modeling systems.

An inter-laboratory team, led by the Environmental Laboratory (EL) and the Construction Engineering Research Laboratory (CERL) completed a study in fall 1995 and recommended the establishment of a land management modeling and simulation research program. Based on the recommendations of that study, the Directorate of Research and Development, in consultation with laboratory directors and others, established the LMS initiative.

A Special Projects Office for LMS was established in 1997 at CERL. A Director of Special Projects and two Assistant Directors, one for Systems Development and Integration and the other for Process Related Research directed toward land management, were designated. The Director, Assistant Directors, and the various representatives from most of the ERDC laboratories, the Hydrologic Engineering Center, and the Institute for Water Resources, both elements of the Water Resources Support Center, and several USACE Districts comprise the LMS Development Team. Researchers throughout the ERDC laboratories (and their partners) form project teams to perform specific tasks associated with LMS.

In addition to providing an integrated computer framework and maximizing the synergy between the military and civil works communities, LMS seeks to improve the delivery of technology to the field. To this end, LMS development makes use of field demonstrations, which introduce the newest system features to users for feedback while these users continue to identify additional requirements. The problem-solving partnerships between land/water resource managers and technology developers ensure LMS tools are delivered and used as quickly as possible.



While the Civil Works and Military Land Management missions involve different business processes, their specific resource management concerns are remarkably similar

Explosions That Help the Environment??!!

by Wayne Stroupe, PAO



Rick Boyd (left), Miss. Levee Board, and Laura Hyde, Geotechnical and Structures Laboratory technician, load blasting agent into one of the augered holes

The quiet of the late fall Mississippi Delta is suddenly pierced by the shock wave as approximately 400 pounds of explosives are detonated, hurling clay and mud into the air. While this sounds completely destructive, it actually was a beneficial use of explosives in the environment.

At first thought, using explosive excavation would appear to be extreme, but this engineering technique lends itself quite well to work in environmentally sensitive areas – similar to using a laser for surgery. Several years ago, the then Structures Laboratory had used explosives to support a Vicksburg District – U.S. Fish and Wildlife project to blast a 1300-foot-long water control channel in a pristine area of the Yazoo National Forest.

The problem in the Delta was a clay-sand bar on the East Prong of Steele Bayou, about five miles west of Rolling Fork, Miss. The bar was diverting the original river channel further to the west. The Mississippi Levee Board is responsible for the area. Rick Boyd, a technician with the Levee Board, was their lead for the project.

“The bar had built up over the years and caused the river to start eating away at the west bank. The landowner was complaining about it,” said Boyd. “We started looking at different ways to fix the problem.”

The bar had grown to roughly 600 feet long and 75 to 100 feet wide. It was comprised of the sticky, clayey sediment that is prevalent in the Delta. A drag line or other heavy equipment would have been extremely hard to use

in the river channel area, would have been expensive, and would have had permitting problems (due to potential oil and fuel spillage, etc.).

The Levee Board works with the Vicksburg District in such situations. From the previous experience of using explosive excavation, the district contacted ERDC to see if it was feasible for this project.

“If you can sit a piece of heavy equipment on a dry place, it can do the work. But if you are in an area where it’s tough to navigate with heavy equipment or if you have an environmentally friendly type location, explosives are the better way to go,” said Hank McDevitt, the ERDC engineer for this project.

McDevitt was also the engineer on the earlier Yazoo National Forest project. Working with the Levee Board and the Vicksburg District, McDevitt estimated the work could be done explosively for \$10,000.

The project took about four days in early November. The new channel was blasted in a series of five shots, each averaging a little over 100 feet long. Each shot consisted of a parallel series of augered holes, approximately four feet deep and seven feet apart. A plastic bag in each hole was filled with a bucket of blasting agent and an explosive booster. All of the holes for each shot were tied together with detonating cord and fired together.

“From an environmental standpoint, you don’t have to worry about getting heavy machinery in here or oil spills or other potential problems. Explosives are cleaner, quicker, there are no spoil banks, and it’s very economical,” said McDevitt.



The work crew surveys the channel section created by the last explosive shot. One more shot should do it



BOOM!

“I have been impressed with this technique,” said Boyd. “It was an experimental thing for us, but it looks like it is going to work. We may be able to go in and do some minor things ourselves with the technique we learned here.”

Boyd was contacted recently to see how the channel is working. “The new channel we blasted appears to be open and working, but it has been covered with water all winter with the rains we have gotten,” he said. “We still have to do some additional work to close the old channel somehow.”

Who knows. If you are up in the Delta this summer and you hear a distant clap of thunder, but there are no clouds, they just might be working on the river.



Geotechnical and Structures Laboratory technicians Don Rowland (left) and Laura Hyde check out the new channel section created by several explosive shots

ERDC News

Major Shared Resource Center hosts SC2000 DoD booth

The ERDC Major Shared Resource Center, located in the Information Technology Laboratory, was the lead DoD organization in supporting the Supercomputing Conference 2000. The conference was held in November 2000 in Dallas, Tex. ERDC scientists and engineers chaired several sessions, were award-winning participants in a Poster Paper session, and coordinated all activities associated with the DoD booth. The booth displayed scientific accomplishments from the U.S. Army, Navy, Air Force, and the Defense Threat Reduction Agency, as well as technical accomplishments in supercomputing related to operating some of the largest supercomputer centers in the world.

Roberto receives Meritorious Civilian Service Award



Armando J. "Joe" Roberto Jr., was recently presented the Army Meritorious Civilian Service medal by Col. Jim Weller, ERDC Commander.

Roberto received the award for exceptional leadership in the integration of support elements of the seven laboratories that make up the ERDC. He was specifically cited for his mission focus, work ethic, and results-oriented approach during the integration of support functions.

Roberto became Deputy to the Commander of ERDC in April 1999, and serves as the Commander's principal assistant and Chief of Staff for the support elements. The support staff is a virtual team, distributed at all sites, totaling 264 federal employees and numerous contract personnel.

Wuebben selected Deputy Director of CRREL

James "Jim" Wuebben has been selected for the position of Deputy Director, Cold Regions Research and Engineering Laboratory.

In this position, Wuebben will assist Dr. Barbara Sotirin, Director, in managing the laboratory by directing the technical first-line managers. He will also oversee the execution of CRREL's research and engineering technical program, manage physical assets, and assist in the development of new and strategic research program areas at CRREL.



Wuebben is a graduate of Michigan Technological University, and has been a member of the CRREL technical staff since 1975.

Leadership promotions in GSL

Congratulations to the following ERDC team members, who were recently promoted into the following leadership positions in the Geotechnical and Structures Laboratory:

Dr. Robert L. Hall, Chief, Geosciences and Structures Division

Dr. Albert J. Bush, Chief, Engineering Systems and Materials Division

Dr. Mary Ellen Hynes, Technical Director, Civil Works: Geotechnical, Structural & Geosciences

Dr. William P. Grogan, Chief, Concrete Materials Branch

Dr. Joseph P. Koester, Chief, Geotechnical and Earthquake Engineering Branch

Ms. Pamela G. Kinnebrew, Chief, Survivability Engineering Branch

Mr. James "Steve" Shore, Chief, Structural Engineering Branch

Dr. David A. Horner, Chief, Mobility Systems Branch

Mr. Henry S. "Hank" McDevitt, Chief, Impact and Explosion Effects Branch

DB V promotions

The following ERDC employees are being promoted to the research DB V level as a result of panel recommendations to the Director. They are:

Dr. James Baylot, Geotechnical and Structures Laboratory

Dr. Petronella Best, Environmental Laboratory

Dr. Todd Bridges, Environmental Laboratory

Dr. Herbert Fredrickson, Environmental Laboratory

Dr. Robert Ebeling, Information Technology Laboratory

Dr. Phil Malone, Geotechnical and Structures Laboratory

Acham receives Army award

vEnessa Y. Acham, technical marketing specialist at CRREL, received the Commander's Award for Civilian Service.

Brig. Gen. Stephen Rhoades, Commander, North Atlantic Division, presented the award to Acham for her role as the ERDC representative to the NAD Strategic Planning Team. According to Rhoades, "service on this team is an honor and a privilege. Members of the team possess high levels of creativity, motivation, vision, leadership, knowledge of the business and internal focus control."

Acham has been a member of the CRREL team since 1997. She received her master's degree from Northwestern University's Kellogg Graduate School of Management and is a registered architect in the state of New York.

Mather receives Arthur R. Anderson Award

Dr. Bryant Mather, Director Emeritus of the Structures Laboratory, was awarded the prestigious Arthur R. Anderson Award from the American Concrete Institute. The award was presented for recognition of Mather's outstanding contributions to the advancement of knowledge of concrete and its use and knowledge transfer through technical papers, presentations, and standards development.

Mather is only the third Corps employee to receive this award since its inception in 1972. It was previously awarded to Robert Philleo, HQUSACE, in 1981, and Katharine Mather, WES, in 1982.

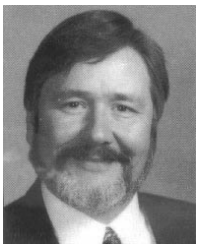


Koh appointed Training Program Coordinator

Susan F. Koh was selected as the Training Program Coordinator for the ERDC. She is responsible for coordinating all aspects of the ERDC training and professional development program, and is physically located at CRREL.

Koh received her master's degree from Dartmouth College and is a graduate of the Army Management Staff College.

Lampo receives national honors



Richard G. Lampo, materials engineer at CERL, recently received several national honors for his work in recycled plastics. He received Honorable Mention in two White House Closing the Circle Awards, one for recycled plastic railroad ties, and another for use of recycled plastic lumber in wetlands recreational projects. This award is presented annually by the White House for partnerships that produce environmentally friendly results for the nation.

Lampo was also named Honorable Mention winner for the 1999 Federal Environmental Engineer of the Year for his contributions in developing industry consensus standards for recycled plastic materials. The Civil Engineering Research Foundation selected Lampo as one of four finalists for the Charles Pankow Award for Innovation.

Lampo's research has involved partnering with U.S. Army and Navy, Rutgers University, commercial railroads and recycled plastics manufacturers, among others.

Petersen named Volunteer of the Year

Bob Petersen, Programs Office, was named the United Way "Volunteer of the Year" for the 2000 Vicksburg-Warren County campaign. Peterson was on the Allocations Committee.

Lawson appointed to staff of Dartmouth

Dr. Dan Lawson, CRREL, was recently appointed an Adjunct Professor in the Department of Earth Sciences at Dartmouth College. Lawson will be involved in collaborative research and will assist in teaching existing classes in geomorphology and glacial geology, as well as serving as a thesis advisor.

CRREL agronomist receives certificate

Antonio Palazzo, research agronomist at CRREL, was recently recognized for his role as a member of the Army Training and Testing Area Carrying Capacity Team.

Palazzo was presented the CERL 2000 Research Product Development Team Award from Bill Goran, Acting Director, CERL. The award recognizes excellence in team efforts to develop technologies for sustainable military installations.

Palazzo has been with CRREL for 26 years, conducting research into plants to revegetate military training lands and mitigate metal contaminated sites.

Zufelt appointed to International Navigation Association

Dr. Jon E. Zufelt, research hydraulic engineer at CRREL, was recently appointed as Principle U.S. Representative to the newly formed PIANC Working Group 9, "Environmental Impacts of Polar Marine Activities."

PIANC, founded in Brussels in 1885, is a worldwide organization comprised of individuals, corporations and national governments concerned with maritime ports and inland waterways. The United States became a member of PIANC in 1902 and participates through the U.S. section, which has three standing and four technical committees.

Bennett paper presented at SMART Conference

Warren Bennett, ITL, was recently chosen to present his research at the Simulation and Modeling for Acquisition, Requirements and Training (SMART) Conference, in Orlando, Fla.

The conference, co-sponsored with NASA, had high-level participation from both the Army and NASA. Only a select few papers were chosen for presentation at this conference that addresses initiatives for building new systems in computers as virtual prototypes before actual systems are built.

Bennett's research is titled, "Interoperable Software Using Object Standards," and was one of only two papers selected for the Standards Breakout Session.

Zeigler selected to coordinate ELC

Elon Zeigler has been named a coordinator for the 2001 Emerging Leaders Conference (ELC), to be held in conjunction with the Senior Leaders Conference during 3-10 Aug 2001 in Chicago. Zeigler is one of six individuals from the ELC class of 2000 who was selected by her peers and the ELC management team to return this year as an ELC Coordinator. She was selected because of the leadership skills she demonstrated and the enthusiasm she brought to the program as a participant last year. As a Coordinator, Zeigler will be responsible for working with the ELC Class of 2001 and the ELC management team to help facilitate the ELC program onsite.

Miller earns degree

Tom Miller, DPW Operations Chief at CERL site, recently earned his doctorate in Education from the University of Illinois. Miller's area of specialization was Human Resource Education.



Letters of appreciation

The following EL team members received letters of appreciation for their contributions:

Dr. Michael Palermo, for his participation in the American Bar Association Plenary Session on Contaminated Sediments.

Dr. Michael Palermo, for his assistance at the San Francisco Bay Decisionmakers Conference.

Dr. Robert Kennedy, for evaluation of research for the Institute of Hydrobiology of the Academy of Sciences, Czech Republic.

Dr. Fred Briuer, for serving as chair of the SERDP Symposium technical session.

Dr. Tommy Myers, for his briefing to the Latvian Delegation on the Corps environment and dredging capabilities.

Degrees, medals, etc.

Dr. Gordon W. "Will" McMahon, GSL, earned his doctorate in Civil Engineering from the University of Illinois at Champaign-Urbana in January 2001.

Dr. Bob Rohani received the Silver de Fleury Medal from the Army Engineer Association upon his retirement from the GSL Engineering and Materials Division in February 2001.

Dr. Danny Frew, GSL, received his doctorate in Mechanical Engineering from Arizona State University in January 2001.

Personnel from the GSL Centrifuge Research Center conducted an extremely successful Workshop in Centrifuge Research Applications in February 2001, and received written congratulations from Dr. Russell Harmon, Senior Program Manager for Terrestrial Sciences, U.S. Army Research Office.

Flowers recognizes team members

Lt. Gen. Robert Flowers, Chief of Engineers, presented coins to ERDC team members for excellence in performance. The coins were presented at the Chief's town hall meeting at the WES site:

Dr. Craig Fisichenich, EL, for his work on 250+ stream restoration projects in over 30 states and several foreign countries.

Jose E. Sanchez, CHL, who has served for two years as team advisor and mentor for the Advanced Placement Physics Class at Warren Central H.S. in a national robotics competition. In the first year, the team finished in the top 20 percent of all participating high schools around the country.

Joe Squire, DPW, for special support to unique hydraulic model construction projects, and for his effective response to numerous plumbing emergencies at all times, day and night.

Dr. Nick Kraus, CHL, for providing excellent customer support to Seattle District and coastal communities in southwest Washington with coastal erosion problems.

Alma Epps, GSL, for her role in standardizing business practices of the GSL as two laboratories combined into one.

Nancy Braswell, Counsel, for her support of restructuring efforts of all Office of Counsels within the ERDC.

Dr. Bob Rohani, GSL, for 30 years of weapons penetration research, and for recent development of a new software package to design new penetrating weapons to defeat hard targets.

Mark Leber, ITL, and Billy Crabtree, Security, for their expertise in the ERDC Information Assurance effort.

AOMS program assists airfield managers

The Airfield Obstruction Management System software program was released May 1. AOMS follows the adage, "a picture is worth a thousand words," providing airfield managers a better tool to depict the true nature of an obstruction. Information that once required several man hours to search through files can now be accessed by AOMS in a matter of seconds.

AOMS allows users to focus on elements specific to their installation, while providing a common interface by incorporating the CADD/GIS Technology Center's Spatial Data Standards as its underlying data structure. Using the Center's standards, AOMS provides assurance that data consistency is maintained. AOMS will also be available for download from the Center's home page at <http://www.tsc.wes.army.mil>.